

IN THE DRAWINGS:

The attached full set of replacement formal sheets includes cancellation of FIG. 5. These sheets, which include FIGs. 1-4, replace the previous drawing sheets, which included FIGs. 1-5. (See attached Replacement Sheet(s) and Annotated Sheet Showing Changes.)

REMARKS

The Final Office Action mailed September 28, 2007, has been received and reviewed. Claims 45-61 are currently pending in the application. Claims 45-61 stand rejected.

Applicants respectfully request reconsideration of the application in light of the arguments presented herein.

Claim Interpretations

The Examiner asserts that “the only constituent to which patentability may be ascribed would be in the composition of the ‘shear ply’ and not to any arrangement thereof in a rocket motor.” *See* Final Office Action of September 28, 2007, p. 2. The Examiner bases this assertion on an argument allegedly made by Applicants in the Appeal Brief of March 5, 2007, while addressing an enablement rejection. In that argument against the enablement rejection,

Applicants merely stated that in light of the fact that rocket motor assemblies are well known in the art, the as-filed specification did not include an in-depth description of the rocket motor assembly. Applicants also stated that based on the knowledge of rocket motor assemblies in the art, the description in the as-filed specification of a shear ply used in a rocket motor assembly would enable one of ordinary skill in the art to make or use the presently claimed invention without undue experimentation. Applicants maintain this statement and submit that this statement does not admit that patentability can only be ascribed to the composition, as asserted by the Examiner.

It is noted that “[d]uring examination, the claims must be interpreted as broadly as their terms reasonably allow. This means that the words of the claim must be given their plain meaning unless the plain meaning is inconsistent with the specification.” *See* M.P.E.P. § 2111.01(I). The plain language of independent claim 45 includes not only a precursor composition, but also “a rocket motor case, a skirt and a shear ply interposed between and connecting the rocket motor case and the skirt, the shear ply comprising a rubber component cured from [the] precursor composition.” These limitations are supported at least paragraph [0014] of the as-filed specification and, thus, cannot be construed as being inconsistent with the as-filed specification. As such, the Examiner is required to interpret the pending claims as

broadly as reasonably possible according to the plain meaning of the words of the claims.

It is respectfully submitted that neither the arguments made by Applicants in the Appeal Brief nor those made by the Examiner in the instant Office Action provides any support that the claims should be interpreted in the manner asserted by the Examiner. As such, it is respectfully requested that the entirety of the pending claims be considered by the Examiner, including the limitation of “a rocket motor case, a skirt and a shear ply interposed between and connecting the rocket motor case and the skirt” as recited in claim 45.

Specification

The Examiner asserts that paragraph [0021.1], FIG. 5, and the amendment to paragraph [0035] constitute new matter. While Applicants disagree with the Examiner’s position, in an effort to advance prosecution regarding the patentability of the claimed invention, Applicants have canceled FIG. 5 and amended the specification to delete paragraph [0021.1] and the last sentence of paragraph [0035].

In the response filed on August 14, 2006, Applicants sought to add FIG. 5 to the application to provide an understanding of the subject matter sought to be patented, as required by 35 U.S.C. § 113. However, based on the Examiner’s objections, it appears that such a drawing is not required. As such, Applicants have canceled the subject matter objected to by the Examiner.

35 U.S.C. § 103(a) Obviousness Rejections

Obviousness Rejection Based on U.S. Patent No. 6,554,936 to Metcalf *et al.*, U.S. Patent No. 5,257,761 to Ratz *et al.*, U.S. Patent No. 4,953,476 to Sayles or U.S. Patent No. 3,620,901 to Hartz *et al.*, taken each in view of U.S. Patent No. 5,860,883 to Jonen *et al.*, U.S. Patent No. 6,240,993 to Onaka *et al.*, U.S. Patent No. 6,352,488 to Morris *et al.*, U.S. Patent No. 6,443,866 to Billups or U.S. Patent No. 6,739,854 to Nagata *et al.*

Claims 45-61 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,554,936 to Metcalf *et al.* (“Metcalf”), U.S. Patent No. 5,257,761 to Ratz *et al.* (“Ratz”), U.S. Patent No. 4,953,476 to Sayles (“Sayles”) or U.S. Patent No. 3,620,901 to Hartz *et*

al. (“Hartz”), taken in view of each of U.S. Patent No. 5,860,883 to Jonen *et al.* (“Jonen”), U.S. Patent No. 6,240,993 to Onaka *et al.* (“Onaka”), U.S. Patent No. 6,352,488 to Morris *et al.* (“Morris”), U.S. Patent No. 6,443,866 to Billups (“Billups”) or U.S. Patent No. 6,739,854 to Nagata *et al.* (“Nagata”). Applicants respectfully traverse this rejection, as hereinafter set forth.

To establish a *prima facie* case of obviousness, the prior art reference (or references when combined) must teach or suggest all of the claim limitations. *In re Royka*, 490 F.2d 981, 985 (CCPA 1974); *see also* M.P.E.P. § 2143.03. Additionally, there must be “a reason that would have prompted a person of ordinary skill in the relevant field to combine the [prior art] elements” in the manner claimed. *KSR Int'l Co. v. Teleflex Inc.*, 127 S. Ct. 1727, 1742, 167 L.Ed.2d 705, 75 USLW 4289, 82 U.S.P.Q.2d 1385 (2007). Finally, to establish a *prima facie* case of obviousness, there must be a reasonable expectation of success. *In re Merck & Co., Inc.*, 800 F.2d 1091, 1097 (Fed. Cir. 1986). Furthermore, the reason that would have prompted the combination and the reasonable expectation of success must be found in the prior art, common knowledge, or the nature of the problem itself, and not based on the Applicant’s disclosure. *DyStar Textilfarben GmbH & Co. Deutschland KG v. C. H. Patrick Co.*, 464 F.3d 1356, 1367 (Fed. Cir. 2006); M.P.E.P. § 2144. Underlying the obvious determination is the fact that statutorily prohibited hindsight cannot be used. *KSR*, 127 S.Ct. at 1742; *DyStar*, 464 F.3d at 1367.

The teachings of the applied references are as summarized in Applicants’ response filed on August 24, 2007, and are not repeated herein.

As a preliminary matter, and as described above, Applicants have not tacitly acknowledged that patentability of the claims resides in the shear ply composition. Office Action mailed May 24, 2007, p. 2-3. Furthermore, Applicants note that “the claimed invention must be considered as a whole.” M.P.E.P. § 2141(II). Applicants respectfully submit that patentability resides in the claim as a whole, and that no particular portion of the claim makes it any more patentable than any other portion. As such, the Examiner must view the claim as a whole and in its entirety.

Applicants respectfully submit that a *prima facie* case of obviousness of claims 45-61 has not been established as the combination of applied references does not teach or suggest all of the

claim limitations, does not provide a reason that would have prompted a person of ordinary skill in the relevant field to combine in the manner asserted by the Examiner, and does not provide a reasonable expectation of success.

It is respectfully submitted that the applied references do not teach or suggest all of the limitations of independent claim 45 because Metcalf, Ratz, Sayles, Hartz, Jonen, Onaka, Morris, Billups and Nagata, alone or in combination, do not teach or suggest the limitation of “a rocket motor case, a skirt and a shear ply interposed between and connecting the rocket motor case and the skirt, the shear ply comprising a rubber component cured from a precursor composition comprising: a first hydrogenated nitrile conjugated-diene copolymer modified by a metal salt unsaturated carboxylic acid ester, wherein the first hydrogenated nitrile conjugated-diene copolymer is derived from a first composition comprising a first ethylenically unsaturated nitrile and a first conjugated diene; a second hydrogenated nitrile conjugated-diene copolymer derived from a second composition comprising a second ethylenically unsaturated nitrile and a second conjugated diene, wherein the second hydrogenated nitrile conjugated-diene copolymer is not modified with a metal salt unsaturated carboxylic acid ester; and a curing agent.”

The Examiner asserts that each of Metcalf, Ratz, Sayles and Hartz “specifically shows the conventionality to use nitrile rubbers for shear ply components in rocket engines.” *See* Final Office Action of September 28, 2007, p. 4. However, as implicitly acknowledged by the Examiner, Metcalf, Ratz, Sayles and Hartz, alone or in combination, do not teach or suggest a shear ply that comprises a rubber component cured from a precursor composition as recited in claim 45. Rather, each of Metcalf, Sayles and Hartz describes insulative materials for rocket motor assemblies that contain nitrile rubbers, such as acrylonitrile-butadiene rubber (NBR). Specifically, Metcalf teaches a shear ply material that includes an elastomeric material, such as Kevlar (para-aramid), and a curable rubber. Sayles and Hartz do not describe a shear ply, but rather an insulative material. While Ratz describes a shear ply that includes a nitrile rubber (acrylonitrile-butadiene rubber), Ratz does not teach or suggest a shear ply comprising a rubber component cured from a precursor composition as recited in claim 45.

The Examiner implicitly acknowledges that Metcalf, Ratz, Sayles and Hartz do not teach or suggest a shear ply comprising the rubber component cured from the precursor composition

recited in claim 45. *Id.*, p. 5. In an effort to cure the deficiencies of Metcalf, Ratz, Sayles and Hartz, the Examiner relies on Jonen, Kinoshita, Onaka, Morris, Billups, and Nagata as teaching “the manufacture of power transmission belts that may comprise a first hydrogenated nitrile conjugated-diene copolymer modified by a metal salt unsaturated carboxylic acid ester, a second hydrogenated nitrile conjugated-diene copolymer and a curing agent, as recited and claimed herein. The constituents are shown to be conventional with the final product possessing ‘flexion, strength, and high-temperature properties’ as required for power transmission belts.” *Id.* However, Jonen, Kinoshita, Onaka, Morris, Billups, and Nagata also do not teach or suggest the above-mentioned limitation because they do not teach or suggest a shear ply that comprises a rubber component cured from a precursor composition as recited in claim 45, where the shear ply is interposed between and connecting a rocket motor case and a skirt.

Since the primary references (*i.e.*, Metcalf, Ratz, Sayles and Hartz) or the secondary references (*i.e.*, Jonen, Kinoshita, Onaka, Morris, Billups and Nagata) do not teach or suggest all of the claim limitations, the Examiner asserts that combination of the primary references and the secondary references would be obvious. The Examiner states that since the primary references all show the conventionality of using nitrile rubbers for the shear ply and the secondary references teach the precursor composition recited in claim 45, the use of the rubber compositions of the secondary references would be obvious to a practitioner. *Id.*, p. 4-5. However, the Examiner has not provided an objective reason for combining the teachings of the primary references and the secondary references to produce the claimed invention. In the absence of an objective reason that would have prompted a person of ordinary skill in the art to combine the elements of a rocket motor assembly with those of a transmission belt, it is respectfully submitted that the obviousness rejection 35 U.S.C. § 103(a) is improper.

Additionally, Applicants submit that one of ordinary skill in the art, without the benefit of hindsight, would not be motivated to replace the nitrile rubbers used in the rocket motor assemblies of the primary references with the transmission belt compositions of the secondary references. Applicants note that “[a] patent composed of several elements is not proved obvious merely by demonstrating that each of its elements was, independently, known in the prior art.” *KSR*, 127 S.Ct. at 1741. While the secondary references describe transmission belts including a

hydrogenated nitrile conjugated-diene copolymer modified by a metal salt unsaturated carboxylic acid ester, there is no objective reason that would have prompted combination with the primary references to form a shear ply interposed between a rocket motor case and a skirt, the shear ply comprising a rubber component cured from a precursor composition as recited in claim 45.

As acknowledged by the Examiner, the transmission belts of the secondary references possess “flexion, strength, and high-temperature properties” as required for power transmission belts.” *Id.*, p. 4 (emphasis added). However, nothing in the applied references, common knowledge, or nature of the problem provides any reason that the transmission belts of the secondary references have properties suitable for use in a more harsh environment, such as in a rocket motor assembly. Moreover, the Examiner has not provided an objective reason that would have prompted one of ordinary skill in the art to use the transmission belts of the secondary references in a rocket motor assembly, where more extreme conditions are encountered. As such, one of ordinary skill in the art, without the benefit of hindsight, would not be prompted to combine the primary and secondary references in the manner asserted by the Examiner.

Applicants further submit that one of ordinary skill in the art would not have had a reasonable expectation of success. The Examiner cites to paragraph [0008] of the as-filed specification and asserts that “the constituents [of Jonen, Kinoshita, Onaka, Morris, Billups and Nagata] are shown to be conventional with the final product possessing ‘flexion, strength, and high-temperature properties’ as required for power transmission belts.” *Id.*, p. 4. However, it is respectfully submitted that one of ordinary skill in the art would recognize that a shear ply in a rocket motor would encounter a different environment than a transmission belt. As one example, one of ordinary skill in the art would expect a rocket motor to be exposed to far greater temperatures than a transmission belt. As such, one of ordinary skill in the art would not have a reasonable expectation of success that the composition of a transmission belt could be used as a shear ply for a rocket motor.

Further, with respect to the claimed subject matter, which is not merely a rubber composition, but a shear ply for a rocket motor including a rubber component cured from a precursor composition, it is respectfully submitted that the secondary references, which teach transmission belts, comprise non-analogous art. Applicants note that “[i]n order to rely on a

reference as a basis for rejection of an applicant's invention, the reference must either be in the field of applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the inventor was concerned." *See M.P.E.P. § 2141.04(a)(I).* It is respectfully submitted that one of ordinary skill in the art would not consider the transmission belts of Jonen, Kinoshita, Onaka, Morris, Billups and Nagata pertinent to forming a shear ply for a rocket motor.

Since the applied references do not teach or suggest all of the claim limitations, do not provide a reason that would have prompted a person of ordinary skill to combine in the manner asserted by the Examiner, and do not provide a reasonable expectation of success, it is respectfully submitted that the applied references do not support a *prima facie* case of obviousness of claim 45.

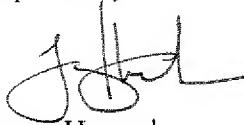
Each of dependent claims 46-61 is allowable, among other reasons, for depending from independent claim 45, which is allowable.

Therefore, it is respectfully requested that the 35 U.S.C. § 103(a) rejection of claims 45-61 be withdrawn, and that each of these claims be allowed.

CONCLUSION

Claims 45-61 are believed to be in condition for allowance, and an early notice thereof is respectfully solicited. Should the Examiner determine that additional issues remain which might be resolved by a telephone conference, the Examiner is respectfully invited to contact Applicants' undersigned attorney.

Respectfully submitted,



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KAH:TH/dlm:ec

Document in ProLaw

TITLE: ROCKET MOTOR ASSEMBLY
INCLUDING HIGH STRENGTH RUBBER
FORMULATIONS (as amended)
Inventor: Harvey et al.
Serial No.: 10/783,867
Docket No.: 2507-5732.2US
ANNOTATED SHEET SHOWING CHANGES

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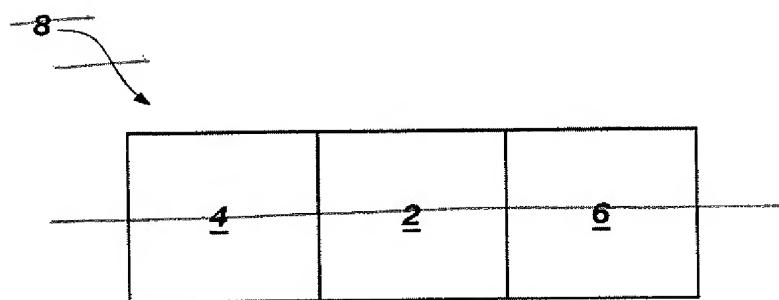


FIG. 5

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